

Effective resistances for supercritical percolation clusters in boxes

Yoshihiro Abe (Kyoto University)

Consider the largest supercritical percolation cluster in $[-n, n]^d \cap \mathbb{Z}^d$, $d \geq 2$. In this talk, I will describe an estimate on effective point-to-point resistances for the largest cluster. The estimate implies that the cover time for the simple random walk on the largest cluster is comparable to $n^d(\log n)^2$. It is well known that the cover time for the simple random walk on $[-n, n]^d \cap \mathbb{Z}^d$ is of order $n^d \log n$ for $d \geq 3$ and of order $n^2(\log n)^2$ for $d = 2$. The result exhibits a quantitative difference between the two walks for $d \geq 3$. The proof is based on classical percolation techniques such as Kesten's crossing probability estimate and the static renormalization argument.